Prescription Drug Abuse and Workplace Absenteeism: Evidence from the 2008–2012 National Survey on Drug Use and Health

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Abstract:

Prescription drug abuse has become increasingly prevalent in recent years, yet little is known about its impact on workplaces. This study investigated the relation between self-reported misuse of prescription pain relievers and other drugs and self-reported workplace absenteeism. Using data from the 2008–2012 National Survey on Drug Use and Health and controlling for confounding factors, the authors found that workers who reported misuse of prescription drugs were about 7% points more likely to report any past-month absenteeism. In addition, they were absent for an additional 0.25 days, compared to workers who did not report prescription drug misuse. The authors did not find evidence that these results varied for prescription pain relievers as compared to other prescription drugs. Future work is needed to study a broader range of workplace outcomes.

Keywords: absenteeism | opioid pain relievers | prescription drug misuse

Article:

Introduction

Prescription drug abuse has become increasingly prevalent in recent years. Data from the National Survey on Drug Use and Health (NSDUH) show that in 2011 an estimated 6.1 million people age 12 and older used prescription drugs nonmedically during the prior month (Substance Abuse and Mental Health Services Administration [SAMHSA], 2012a). The majority of nonmedical users (4.5 million) used prescription pain relievers. Perhaps more troubling is that in 2010 an estimated 2.4 million people used prescription drugs nonmedically "for the first time" during the past year. New users tend to be young, with an average age of 22 years. Individuals age 12 to 25 years old were more likely to misuse prescription drugs than any other type of illicit drug except marijuana (SAMHSA, 2012a).

The prevalence of prescription drug misuse has had a significant impact on health and health care utilization. Between 1999 and 2010 the death rate due to the abuse of prescription opioid pain relievers—the type of prescription drug that is most commonly misused—increased fourfold (Jones, Mack, & Paulozzi, 2013; Paulozzi, Jones, Mack, & Rudd, 2011). In 2010 an

estimated 38,329 deaths were associated with drug overdoses. In 58% of those deaths one or more prescription drugs were involved. Between 2004 and 2010 the estimated number of emergency room (ER) visits that involved the nonmedical use of pharmaceuticals rose from 626,472 to 1,345,645 visits (SAMHSA, 2012b). Among individuals age 12 and older admitted to substance abuse treatment facilities, the percentage who reported abusing prescription pain relievers rose from 2.2% in 1998 to 9.8% in 2008; the corresponding rise for benzodiazepine abuse was from 1.3 to 3.2% (SAMHSA, 2010).

Recently, several studies have calculated societal cost estimates for the most frequently misused category of prescription drugs, namely, opioid pain relievers such as OxyContin and Vicodin. The estimates are quite variable. Total economic cost of prescription opioid abuse was estimated at $8.6 billion in 2001, $4.6 billion (53%) of which was attributed to the workplace in terms of wage losses due to reduced productivity, premature death, incarceration, and reduced employment (Birnbaum et al., 2006). Total economic costs in 2006 and 2007 were estimated at $53.4 billion and $55.7 billion, respectively (Birnbaum et al., 2011; Hansen, Oster, Edelsberg, Woody, & Sullivan, 2011). The share of costs that was attributed to lost productivity in these years was 79% and 46%. In 2009, medical and productivity costs of opioid poisoning—a category that captures portions of misuse and misadventure in high-dose therapeutic use—were estimated at $20.4 billion, including absenteeism costs of $335 million and forgone future earnings due to mortality of $18.2 billion (Inocencio, Carroll, Read, & Holdford, 2013). The large range of cost estimates results from differences in the methodology and data sources used.

The current evidence points to a nontrivial prevalence of prescription drug misuse in the workplace and suggests that the costs to workplaces could be substantial (Birnbaum et al., 2011; Reutsch, 2010). These costs arise for a number of reasons. First, employees who misuse prescription drugs may be less likely to show up for work (absenteeism) and may be less productive when they are at work (Serxner, Gold, & Bultman, 2001). For example, a study using data from the 2002–2004 NSDUH showed that nonmedical users of prescription opioids were significantly more likely to experience psychiatric symptoms of panic, depression, and social phobia/agoraphobia, conditions that are likely to affect job performance (Becker, Sullivan, Tetrault, Desai, & Fiellin, 2008). Second, substance use is associated with workplace injuries, which can be extremely costly to employers (Ramchand, Pomeroy, & Arkes, 2009). Third, prescription drug misuse may lead to increased job turnover. Fourth, the cost to employers of employee medical insurance can rise due to higher health care utilization among those workers who misuse prescription drugs.

In this study, we focus on one outcome in particular, namely absenteeism, and empirically quantify its relation with (self-reported) prescription drug misuse among workers. Employees who misuse prescription drugs are more likely to be impaired and may therefore be more likely to avoid work or to take advantage of paid time off. The focus on absenteeism alone is partly determined by data limitations in this study sample. An assessment of the relation between other workplace variables and prescription drug misuse is therefore left for future study. However, absenteeism is an important variable to study, because it is arguably a more immediate result of prescription drug misuse and can subsequently affect the workplace and employers in several, negative ways. First, it directly reduces productivity and profitability. One study estimated the average annual cost to employers of unscheduled absenteeism as high as $660 per employee

(Navarro & Bass, 2006). Second, repeated absenteeism can also erode relations and increase tension among employees particularly if it is suspected that the absenteeism is related to drug abuse.

To our knowledge, only two studies explicitly considered absenteeism and associated costs in relation to prescription opioid misuse. One study estimated the total cost of excess disability and medically related absenteeism due to prescription opioid abuse at $2.6 billion in 2007, or 10.2% of total productivity losses (Birnbaum et al., 2011). The second study considered only opioid poisoning and estimated the costs of absenteeism at $335 million in 2009, or 1.8% of total productivity losses (Inocencio et al., 2013). This study is different and novel in several respects. First, the two previous studies estimated absenteeism due to health care utilization on the basis of claims and utilization data. In this context, a day spent in the ER or hospital was a lost day of work. In contrast, this study uses a self-reported measure of absenteeism, where absenteeism can be related to sickness, injury, or a lack of motivation. Second, there is a difference in how the population of workers who misuse prescription drugs is identified. The previous studies used a clinical diagnosis of opioid misuse and abuse (Birnbaum et al., 2011) or a clinical diagnosis of opioid poisoning (Inocencio et al., 2013). In contrast, this study relies on self-reported misuse, and we investigate not only misuse of prescription opioids but also misuse of other prescription drugs. Third, our analysis is based on data from the NSDUH from a more recent time period. The use of recent data is important, given the surge in prescription drug misuse in recent years. The advantage of using the NSDUH is that it provides a nationally representative sample. Moreover, the NSDUH contains a rich set of individual and workplace characteristics, which allows us to analyze the relation between prescription drug misuse and absenteeism in a regression framework, while (partially) controlling for other, confounding factors that affect absenteeism. Although to some extent the previous studies controlled for basic demographic characteristics, we used additional controls for physical and mental health, the use of other substances, workplace characteristics and occupation type.

Method

Data and Sample Selection

We used data from the 2008–2012 NSDUH. The NSDUH is a nationally representative survey of the noninstitutionalized population in the United States age 12 or older (SAMHSA, 2012a). The survey contains a prescription drug module that was specifically designed to measure misuse. The sample for this analysis was restricted to those who were age 18 or older at the time of the interview and who reported having current part-time or full-time employment. Of the 191,132 respondents who were age 18 years or older, a total of 122,346 respondents (64%) reported current part-time or full-time employment.

Absenteeism and Prescription Drug Misuse

The NSDUH contains two separate questions related to workplace absenteeism during the past 30 days. The first asks respondents how many days they missed work due to sickness or injury; the second asks how many days were missed because they did not want to be at work. Our outcome variable was total absenteeism, calculated as the sum of the responses to the two

absenteeism questions. We used the sum because recall bias (i.e., the respondent may have had trouble recalling the exact reason for a particular day of absenteeism) and justification or desirability bias (i.e., the respondent may be more likely to attribute absenteeism to sickness or injury than to a lack of work motivation) may have led to over-reporting of days of missed work due to sickness or injury and to under-reporting of days of missed work because someone did not want to be at work. As such, we believe that the sum of responses as a measure of total absenteeism is likely to suffer less from reporting error than the two separate absenteeism responses.

Our primary explanatory variables were three indicators for prescription drug misuse during the past 30 days. The NSDUH asks respondents when they last used a particular type of prescription drug that was not prescribed to them or that they only took for the experience or feeling that it caused. From this we created indicators for past-month misuse of any prescription drug, past-month misuse of prescription pain relievers and past-month misuse of prescription drugs other than pain relievers.

Covariates

We included socioeconomic and demographic covariates in the statistical model, including sex, age, education, income, race, marital status, and job type (part-time or full-time). We accounted for differences in health status by including a set of indicators for overall health (five categories, ranging from excellent health to poor health) and for having experienced serious psychological distress during the past month (based on the Kessler-6 scale; Kessler et al., 2003).

Absenteeism may also vary because of differences in workplace characteristics. For example, some occupations are associated with more job-related stress, which could lead to higher absenteeism rates. Employees at larger organizations may be more absent if they have paid time off. To account for such differences, we used indicators for the type of occupation (14 categories) and organizational size (five categories), and two indicators for the presence of an alcohol and drug policy and for drug testing in the workplace. The use of other substances is correlated with prescription drug misuse and may affect absenteeism as well. Hence, indicators for past-month tobacco use, for heavy alcohol use—based on the standard NSDUH definition of having had five or more drinks on a single occasion on 5 or more days during the past 30 days—and for illegal drug use were included in the model. Because methamphetamine is produced legally and illegally, it is addressed in the prescription drug and illicit substances sections of the NSDUH (SAMHSA, 2009). To avoid overlap in our indicators, methamphetamine was included in the prescription drug misuse indicator when it was reported in the prescription drug section but excluded altogether from the indicator for illegal drug use. This was unlikely to affect our analysis, as only 0.05% of the unweighted sample reported use of methamphetamines outside of the prescription drug module of the survey.

Statistical Analysis

All analyses were conducted with Stata version 13 (Statacorp, 2013). The “svyset” command together with survey weights from the NSDUH were used to account for the complex survey design. We calculated weighted averages of all variables for the entire sample and separately for

those who did and those who did not misuse prescription drugs during the prior 30 days. We also tested for statistically significant differences between the two groups.

We used a logistic regression model to estimate the relation between prescription drug misuse and the probability of being absent from work 1 or more days during the past month, controlling for the other covariates. We used a negative binomial regression model to estimate the relation between prescription drug misuse and total days of past-month absenteeism, again controlling for the other covariates. This model was used because it allows for overdispersion relative to a Poisson model (Cameron & Trivedi, 1986, 2005). The logistic model and the negative binomial model were estimated twice: once with inclusion of a single indicator for any past-month prescription drug misuse, and once with the single misuse indicator replaced by two separate indicators for misuse of prescription pain relievers and misuse of other prescription drugs. This was done to assess, first, whether an association between prescription drug misuse and absenteeism existed, and second, whether the association was different for prescription pain relievers compared to other prescription drugs. For each model, we estimated the marginal effects (with the "margins" command in Stata) of selected covariates, and the associated standard errors, t statistics and p values. For the logistic models, the marginal effect is the (covariate-adjusted) difference in the probability of being absent between two groups (e.g., those who misused prescription drugs and those who did not). For the negative binomial models, the marginal effect is the (covariate-adjusted) difference in days of past-month absenteeism between two groups.

Results

Table 1 gives sample means for all variables. Between 2008 and 2012 the 30-day prevalence of prescription drug misuse among those who reported current employment was 2.7%. Prescription pain relievers were more frequently misused (1.9%) than other prescription drugs (1.2%). Those in the workforce who misused prescription drugs were more absent from work (1.3 vs. 0.8 days), and more likely to be heavy alcohol users, use tobacco, and use illegal drugs. Misusers were somewhat less likely to have full-time employment and more likely to work for smaller organizations (with fewer than 25 employees). Those who misused prescription drugs were more likely to work in certain occupation types, including service, sales, and construction/extraction, and less likely to work for employers who have a written drug and alcohol policy, or who conduct drug and alcohol testing. They were more likely to be male (56 vs. 53%) and White (76 vs. 67%), and less likely to be married (34 vs. 57%), compared to those who did not misuse prescription drugs. Misusers were also younger, less educated, and had a lower income than those who did not misuse. Finally, workers who misused prescription drugs were less likely to report excellent overall health (16 vs. 26%) and more likely to have experienced serious psychological stress during the past month (13 vs. 3.3%).

TABLE 1 Characteristics of Prescription Drug Misusers and Nonmisusers in the Workforce; 2008–2012 National Survey on Drug Use and Health

	Past Month Prescription Drug Misuse			
	Yes	No	All	Test Statistic (p value)
Days absent from work	1.3	0.8	0.8	42.6 (0.00)
Substance use and misuse: past 30 days (%)				
Any prescription drug misuse			2.7	
Prescription pain reliever misuse			1.9	
Prescription drug misuse (excluding pain relievers)			1.2	
Heavy alcohol use	26	7.9	8.4	752 (0.00)
Tobacco use	62	30	31	679 (0.00)
Illegal drug use	43	6.3	7.3	3560 (0.00)
Workplace characteristics				
Full-time employment (%)	75	79	79	23.6 (0.00)
Organizational size (employees; %)				
<10	34	29	29	18.7 (0.00)
10–24	19	17	17	5.3 (0.03)
25–99	23	22	22	0.4 (0.53)
100–499	16	18	18	2.2 (0.14)
≥500	8	14	14	58.3 (0.00)
Occupation type (%)				
Service	21	12	13	109 (0.00)
Office & administrative support	11	13	13	2.3 (0.12)
Sales	12	10	10	5.8 (0.02)
Executive/ management/ financial	12	15	15	6.6 (0.01)
Professional	8.1	12	12	21.3 (0.00)
Technicians and support	4.9	5.1	5.1	0.17 (0.68)
Education	2.9	6.3	6.2	36.6 (0.00)
Entertainment/sports/ media	2.5	2.3	2.3	0.16 (0.69)
Protective service	1.5	2.4	2.4	5.1 (0.03)
Farming/fishing/ forestry	0.9	0.8	0.8	0.45 (0.51)
Installation/ maintenance/repair	3.4	3.7	3.7	0.22 (0.64)
Construction/ extraction	7.5	5.7	5.8	10.9 (0.00)
Production & machinery operators	5.9	5.9	5.9	0.00 (0.99)
Transportation & material moving	5.7	5.7	5.7	0.00 (0.99)
Written drug/alcohol policy (%)	69	77	77	41.2 (0.00)

	Past Month Prescription Drug Misuse			
	Yes	No	All	Test Statistic (p value)
Drug/alcohol testing (%)	43	49	48	15.0 (0.00)
Employee demographics				
Male (%)	56	53	53	11.7 (0.00)
White (%)	76	67	68	50.0 (0.00)
Married (%)	34	57	56	213 (0.00)
Age (%)				
18–20	11	4.8	5.0	276 (0.00)
21–25	21	9.6	9.9	344 (0.00)
26–29	13	8.7	8.9	32.5 (0.00)
30–34	14	10	10	18.9 (0.00)
35–49	27	34	34	23.3 (0.00)
≥50	15	33	32	101 (0.00)
Education (%)				
Non high school graduate	14	10	10	27.0 (0.00)
High school graduate only	30	28	29	2.3 (0.14)
Some college	31	28	28	10.1 (0.00)
College	24	34	33	63.2 (0.00)
Income (%)				
<$10,000	21	13	13	112 (0.00)
$10,000–$19,999	23	16	17	61.1 (0.00)
$20,000–$29,999	16	16	16	0.13 (0.72)
$30,000–$39,999	12	14	13	1.46 (0.23)
$40,000–$49,999	9.2	11	11	6.0 (0.02)
$50,000–$74,999	10	15	15	16.6 (0.00)
$75,000+	8.3	15	15	36.5 (0.00)
Health (%)				
Excellent	16	26	26	103 (0.00)
Very good	40	40	40	0.15 (0.70)
Good	33	26	26	51.4 (0.00)
Fair	9.2	6.6	6.7	16.3 (0.00)
Poor	1.1	0.7	0.7	3.4 (0.07)
Serious psychological distress (past 30 days; %)	13	3.3	3.6	492 (0.00)
Sample size (unweighted)	4,757	117,589	122,346	

Note. The last column contains the values of test statistics and p values, used for testing for statistically significant differences in each variable between workers who did and those who did not misuse prescription drugs during the past 30 days. For days of absenteeism, we report the Wald F-statistic. For all other values, we report a modified F statistic, based on the Pearson chi-squared test for independence. All statistics were adjusted for the complex survey design.

The distributions of the number of days absent (during the past 30 days) for employees who misused prescription drugs and for those who did not misuse are displayed in Figure 1. Those who misused prescription drugs were less likely to have no days of absenteeism (64 vs. 77% among those who did not misuse), and therefore more likely to have at least 1 day of absenteeism. For example, 8.0% of misusers had 2 days of absenteeism, versus 5.6% among workers who did not misuse prescription drugs.

Selected estimates from the logistic regression models for the probability of any absenteeism are given in Table 2. The variables in Table 1 were used as control variables. We also used a full set

of pairwise interactions between the indicators for prescription drug misuse, heavy alcohol use, and illegal drug use. In Model 1 we used an indicator for any past-month prescription drug misuse as primary independent variable. In Model 2, this indicator was replaced by separate indicators for past-month misuse of prescription pain relievers and past-month misuse of other prescription drugs. From Model 1, we see that misuse of any prescription drug was associated with a 7.4%-point increase in the probability of being absent. Illegal drug use and psychological distress were associated with increases of 4.3 and 7.4% points, respectively, in the probability of any absenteeism. If the workplace had a written drug and alcohol policy, workers were also slightly more likely to be absent. Estimates from Model 2 show that misuse of prescription pain relievers and misuse of other prescription drugs were associated with 5.5%- and 8.2%-point increases in the probability of absenteeism. However, the difference in marginal effects was not statistically significant ($p = .445$). The remaining marginal effects estimated from Model 2 are similar to those from Model 1.

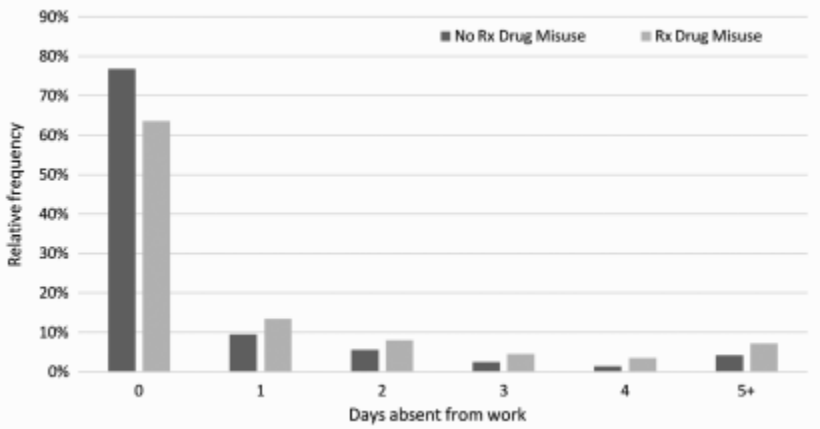

FIGURE 1 Days absent from work (during the past 30 days) among recent prescription drug misusers and nonmisusers in the workforce; 2008–2012 National Survey on Drug Use and Health. Note. All between-group differences in relative frequencies were statistically significant. The smallest value of the F statistic (adjusted for the complex survey design) was 17.0 and all p values were less than 0.00.

Table 3 contains estimates from the negative binomial model. The estimated overdispersion parameter for Models 3 and 4 was 6.8 in both models (95% confidence interval [CI]: [6.6, 7.0]), suggesting that the negative binomial model provided a better fit than a Poisson model. We also estimated zero-inflated versions of the negative binomial model (results not reported here). The zero-inflated models, however, yielded extreme coefficients and standard errors for some of the control variables, which indicated a lack of identification in these specifications. Moreover, we were unable to test for zero inflation, because the use of sampling weights renders the conventional likelihood-ratio type tests invalid. The standard negative binomial model was therefore our preferred specification for days of absenteeism.

Table 2 Logistic Regression Estimates for any Workplace Absenteeism Versus None; 2008–2012 National Survey on Drug Use and Health

Variable	Model 1		Model 2	
	Marginal Effect (SE)	*t* Statistic (*p* Value)	Marginal Effect (SE)	*t* Statistic (*p* Value)
Any prescription drug misuse	0.0744 (0.0150)	4.97 (0.00)		
Prescription pain reliever misuse			0.0546 (0.0172)	3.18 (0.00)
Prescription drug misuse (excluding pain relievers)			0.0821 (0.0292)	2.81 (0.01)
Heavy alcohol use	0.0110 (0.0072)	1.53 (0.13)	0.0109 (0.0072)	1.51 (0.13)
Illegal drug use	0.0426 (0.0081)	5.24 (0.00)	0.0422 (0.0081)	5.22 (0.00)
Tobacco use	0.0223 (0.0036)	6.24 (0.00)	0.0222 (0.0036)	6.21 (0.00)
Serious psychological distress (past 30 days)	0.0744 (0.0093)	8.00 (0.00)	0.0738 (0.0093)	7.97 (0.00)
Written drug/alcohol policy	0.0168 (0.0065)	2.59 (0.01)	0.0168 (0.0065)	2.61 (0.01)
Drug/alcohol testing	0.0047 (0.0056)	0.85 (0.40)	0.0047 (0.0056)	0.84 (0.40)

Note.All variables listed in Table 1 were used as control variables in the logistic regression model, as well as a set of year indicators (2009–2012) and a complete set of pairwise interactions between the drug and alcohol use indicators. In Model 1 we used a single indicator for past-month misuse of any prescription drug. In Model 2, we replaced this by two separate indicators for misuse of prescription pain relievers and misuse of prescription drugs, excluding pain relievers.

Table 3 Negative Binomial Regression Estimates for Days of Workplace Absenteeism; 2008–2012 National Survey on Drug Use and Health

Variable	Model 3		Model 4	
	Marginal Effect (SE)	*t* Statistic (*p* Value)	Marginal Effect (SE)	*t* Statistic (*p* Value)
Any prescription drug misuse	0.2487 (0.0874)	2.85 (0.00)		
Prescription pain reliever misuse			0.1696 (0.1071)	1.58 (0.11)
Prescription drug misuse (excluding pain relievers)			0.3059 (0.1690)	1.81 (0.07)
Heavy alcohol use	0.0149 (0.0505)	0.29 (0.77)	0.0148 (0.0505)	0.29 (0.77)
Illegal drug use	0.1917 (0.0587)	3.26 (0.00)	0.1901 (0.0587)	3.24 (0.00)
Tobacco use	0.0374 (0.0330)	1.13 (0.26)	0.0367 (0.0329)	1.11 (0.27)
Serious psychological distress (past 30 days)	0.6760 (0.0847)	7.98 (0.00)	0.6758 (0.0844)	8.01 (0.00)
Written drug/alcohol policy	−0.0570 (0.0589)	−0.97 (0.33)	−0.0564 (0.0589)	−0.96 (0.34)
Drug/alcohol testing	0.0930 (0.0353)	2.63 (0.01)	0.0929 (0.0353)	2.63 (0.01)

Note. all variables listed in Table 1 were used as control variables in the negative binomial regression model, as well as a set of year indicators (2009–2012) and a complete set of pairwise interactions between the drug and alcohol use indicators. In Model 3 we used a single indicator for past-month misuse of any prescription drug. In Model 4, we replaced this by two separate indicators for misuse of prescription pain relievers and misuse of prescription drugs, excluding pain relievers.

Estimates from Model 3 show that prescription drug misuse was associated with an additional 0.25 days of past-month absenteeism, or about 3 additional days/year. A similar marginal effect (ME) was found for illegal drug use (ME = .19), but the marginal effect for serious psychological distress was substantially higher (ME = .68). We tested for heterogeneity of the marginal effect of prescription drug misuse across subgroups defined by the heavy alcohol use and illegal drug use indicators but found none ($p \geq .394$). Finally, drug and alcohol testing in the workplace was associated with a statistically significant but small (0.09 days) increase in absenteeism.

Estimates from Model 4 show that misuse of prescription pain relievers was associated with 0.17 additional days of past-month absenteeism, whereas misuse of other prescription drugs was associated with 0.31 additional days of past-month absenteeism, but both marginal effects were not statistically significant at the 5% level. The difference between the two marginal effects was not statistically significant ($p = .528$) and the marginal effects did not change significantly depending on the use of other substances (results not reported here). Finally, Table 3 shows that the marginal effects of illegal drug use, serious psychological distress, and drug and alcohol testing in the workplace were very similar to those obtained from Model 3.

Discussion

The Office of National Drug Control Policy's 2013 (ONDCP; 2013) strategic plan recognizes workplaces as an important focus for substance abuse prevention efforts. Research drawing a link between prescription drug misuse and costs to employers can be a convincing tool for creating a business case for employers to invest in workplace prevention efforts. These efforts can target not only employees, but also their families, which is particularly important for parents of the large number of young people who misuse prescription drugs for the first time every year. Research on the specific negative effects of prescription drug misuse on employers and workplaces, however, is limited and existing work is based on older data.

The contribution of this article was to analyze the relation between prescription drug misuse and absenteeism. Using data from the 2008–2012 NSDUH, we found that misuse of prescription drugs was associated with a 7%-point increase in the probability of being absent, and an increase of 0.25 days of past-month absenteeism, or about 3 days/year. We did not find evidence to suggest that these estimates were different for misuse of prescription pain relievers compared to misuse of other prescription drugs. Interestingly, these marginal effects were larger than for heavy alcohol use and illegal drug use. Finally, having experienced serious psychological distress was also a significant predictor of absenteeism. It was associated with a 7%-point increase in the probability of being absent, and an additional 0.68 days of past-month absenteeism (about 8 days/year).

A limitation of this study is that we did not estimate the causal effect of prescription drug misuse on absenteeism. As such, there are several possible explanations for our empirical findings. First, though we found that misusers of prescription drugs are absent more, this could be the causal result of some other, unobserved influence. In other words, there may be unobserved confounders that lead to increased absenteeism and are positively correlated with prescription drug misuse. Second, there could be underlying and unmeasured health, mental health, and character-related factors that affect absenteeism and, at the same time, partly determine

substance use behaviors. Third, absenteeism itself could be a risk factor for prescription drug misuse, so that causality might "run both ways." To estimate causal effects, a different estimation approach (e.g., instrumental variables) will be needed, which is a topic for future research. A second limitation of this study is that the absenteeism and prescription drug misuse responses in the NSDUH may suffer from measurement error due to under-reporting. Incorporating the possibility of reporting bias into the statistical model would be an interesting future extension of this study.

This study focused on absenteeism and modest associations with prescription drug misuse were found. There are of course other workplace outcomes that are of interest. For example, prescription drug misuse among workers could lead to higher job turnover, thereby raising costs for employers. Analyses of alternative outcomes will necessitate the use of data sources other than, or in addition to, the NSDUH. Additional research should also investigate different rates of prescription drug misuse based on occupational or industry risk factors. For example, the rate among doctors and nurses has been found to be higher than for the general population (Pooler, Sheheen, & Davidson, 2009). These findings would allow more prevention efforts to target those with the highest risk of misusing prescription drugs.

Conclusion

Prescription drug misuse has become a significant problem in recent years. This study is a step toward developing a better understanding of the relation between prescription drug misuse and workplace absenteeism. Our results show that prescription drug misuse was associated with an increase in the likelihood of absenteeism and a modest increase in days of absenteeism. More work is needed to assess causal effects and study other workplace-related variables, including presenteeism (diminished on-the-job performance), workplace injuries and job turnover.

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